

Development of a "Digital Bridge" Thermal Anemometer for Turbulence Measurements, Phase I

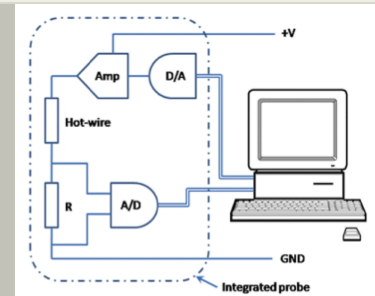
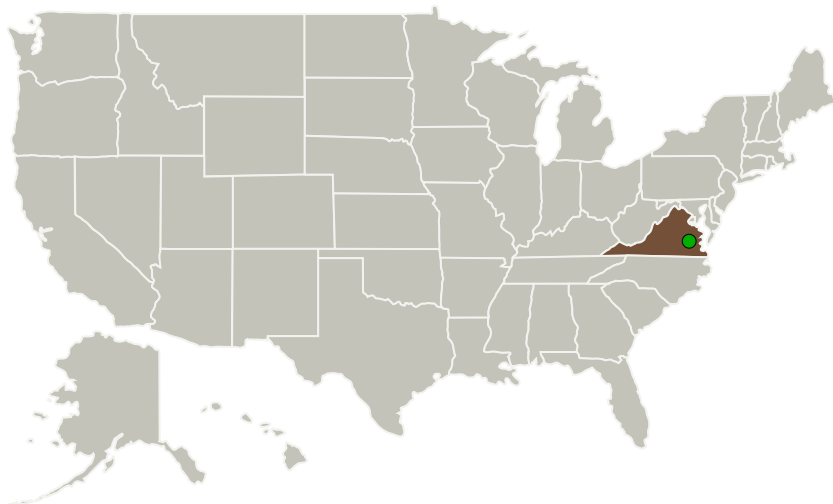
Completed Technology Project (2014 - 2014)



Project Introduction

Thermal anemometry (a.k.a. hot-wire anemometry) has been a key experimental technique in fluid mechanics for many decades. Due to the small physical size and high frequency response of the sensors (resulting in excellent spatial and temporal resolution), the technique has been widely used for studies of turbulent flows. Even with the advent of nonintrusive techniques such as Laser Doppler Velocimetry (LDV) and Particle Image Velocimetry (PIV), hot wire anemometry is uniquely capable of extremely high frequency response and fine spatial resolution measurements. ViGYAN proposes a fundamental change to the anemometer configuration, with two related aspects. First, the circuitry to power the sensor and establish its operating point is packaged immediately adjacent to the sensor, i.e. in the typical probe holder, removing the effect of the cable connecting the sensor to an external anemometer. Second, modern analog-digital conversion hardware will be employed to the maximum extent possible, potentially including directly driving the sensor. Data transmission will then be fully digital, immune to environmental variations or electrical noise. Further, direct excitation would permit the choice of operating modes (not just variation of operating point) by changes in software. The ultimate objective of the research is therefore referred to as a "Digital Bridge".

Primary U.S. Work Locations and Key Partners



Development of a "Digital Bridge" Thermal Anemometer for Turbulence Measurements Project Image

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Organizations Performing Work	Role	Type	Location
Vigyan, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB)	Hampton, Virginia
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations

Virginia

Project Transitions

**June 2014:** Project Start**December 2014:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140517>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Vigyan, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

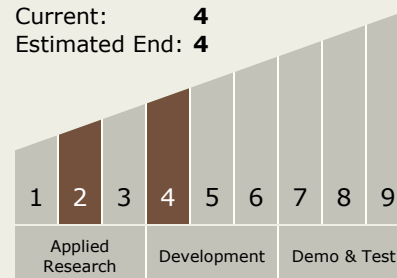
Amber Favaregh

Technology Maturity (TRL)

Start: 2

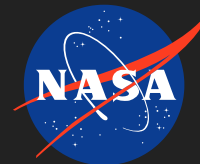
Current: 4

Estimated End: 4

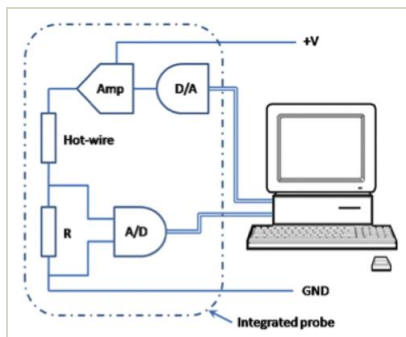


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Images



Project Image

Development of a "Digital Bridge" Thermal Anemometer for Turbulence Measurements Project Image
(<https://techport.nasa.gov/image/129617>)

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.5 Structural Dynamics
 - └ TX12.5.2 Vibroacoustics

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System